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**No. 72**



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18 December 1980

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## NATIONAL DEVELOPMENTS

### BRIEFS

**NATIONAL ACADEMIC SYMPOSIUM**--The national symposium on optics, laser and frontier branches of learning was held in Wuxi from 22 to 24 November. It was attended by over 50 scientists and technicians engaged in the study of laser, physics, chemistry, biology, medicines, agriculture and environmental protection in 13 provinces, municipalities and autonomous regions throughout the country. A total of 32 academic papers were read at the seminar, including 2 papers on anticarcinoma substances derived from combined reactions of ultrasonic laser and anticarcinoma medicinal herbs and the therapeutic effects of a brand new anticarcinoma drug. [Shanghai City Service in Mandarin 1130 GMT 25 Nov 80 OW]

**COMPUTING MECHANICS SYMPOSIUM**--Hangzhou, 24 Nov (XINHUA)--The 1980 national symposium on computing mechanics sponsored by the China Mechanics Society was held in Hangzhou, Zhejiang, in mid-November. Some 299 representatives from all ministries and commissions under the State Council, the Chinese Academy of Sciences, colleges, universities and scientific research institutes delivered 385 theses at the symposium. Qian Lingxi, vice president of the China Mechanics Society, spoke, noting that study on the theory and application of computing mechanics in China has been broadened in recent years and that China is catching up with the international level in this field. Chinese mechanics expert Qian Weichang, deputy director He Guangqian of the building research institute and pneumatic mechanics expert Zhuang Fenggan, as well as American professor Ka-de-si-dun-sai, gave lectures at the symposium. [Beijing XINHUA Domestic Service in Chinese 0133 GMT 24 Nov 80]

**SYSTEMS ENGINEERING SOCIETY**--The Chinese Society of System Engineering was recently founded in Beijing at a meeting. Systems engineering is a new branch of learning. In recent years China has achieved gratifying success in applying systems engineering in coordinating and balancing engineering projects, instituting comprehensive quality control processes in industrial enterprises, mapping out plans for population control and in military equipment programming. The establishment of such a modern scientific and technological department as systems engineering will have great effects in understanding and transforming the objective world. The meeting elected Qian Xuesen and Xue Muqiao as the society's honorary presidents, and elected Guan Zhaozhi as its president. [Text] [OW271205 Beijing Domestic Service in Mandarin 1000 GMT 25 Nov 80 OW]

CSO: 4008

## APPLIED SCIENCES

### CAUSES OF WASTE, INFERIOR PRODUCTS STUDIED

Beijing ZHILIANG GUANLI [QUALITY CONTROL] in Chinese No 4 Aug 80 pp 13-14

[Article by Ling Wenquan [0407 2429 6530] of the Psychology Institute of the Chinese Academy of Sciences]

[Text] Developing quality control is first to seek out the causes that affect quality--i.e., the things that produce waste and inferior products--and then to solve the problem directly. Ordinarily in quality control in industrial and mining enterprises, analysis of problems of the quality of products mostly utilizes the method of mathematical statistics to seek out the causes in materials, machinery and technological and operational methods. Therefore analysis of the human factor is often neglected. Actually, the human being is a very important factor that affects quality. Analysis of the quality of products based on the human factor requires "efficiency theory."

The following talks about "efficiency theory" and the problem of quality analysis.

#### 1. Statistical Analysis

Statistical analysis in the theory of efficiency is generally an analysis of the causes that create waste and inferior products from the point of view of time, location, position, work type, procedure, worker's age and sex.

(1) Time Analysis--the human being is a living entity. Some physiological phenomena of the human body frequently undergo periodic changes over a period of time. These biological regulatory patterns affect the human being's physiological activity and psychological activity. They are further reflected in the quality of products. Therefore, conducting statistical analysis and comparing the quality of products produced by different shifts (day shift, swing shift, night shift) in different months and different seasons are one aspect of searching for the causes of waste and inferior products.

(2) Analysis by Location--Taking the statistical analysis of the occurrence of spots on fur materials as an example, one textile plant compiled the following statistics for October 1979: Spots found on the material 5 meters from the head of the machine constituted 38 percent, spots 5 to 10 meters from the head of the machine constituted 11 percent, and spots 5 meters from the tail end of the machine constituted 10 percent. Spots on the material spanning 5 meters at the



center constituted only 4.5 percent. Thus, it can be seen, statistical analysis according to location is also one clue to searching for waste and substandard products.

(3) Analysis by work procedure--Often a product has to go through many procedures of processing or treatment. Each procedure may cause waste or inferior products. But which procedure is the main one: This requires statistical analysis by procedure. After analysis, the main procedure that affects product quality is treated. In this way, the factors affecting quality can be eliminated during the production process.

## 2. Classification of the Causes of Waste and Inferior Products

There are many causes that create waste and inferior products. They can be classified into the following two main types: human causes and objective causes. Human causes also include physiological and psychological causes. Objective causes include material conditions, social problems, organization and management, technical design, and each aspect can be further divided into many causes (see Figure 1).

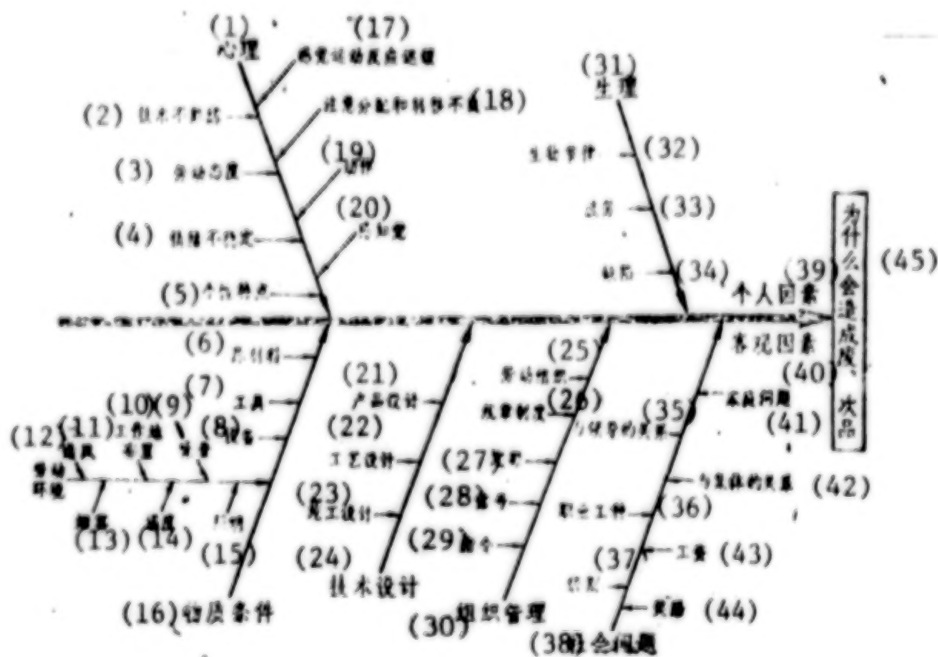


Figure 1. Illustration of the important causes that create waste and substandard products

### Key:

- |                                    |                                |
|------------------------------------|--------------------------------|
| (1) Psychological state            | (7) Tools                      |
| (2) Technically unskilled          | (8) Equipment                  |
| (3) Work attitude                  | (9) Noise                      |
| (4) Emotionally unstable           | (10) Plan of the place of work |
| (5) Characteristics of personality | (11) Ventilation               |
| (6) Raw material                   | (12) Work environment          |

[key continued next page]

[Key to Figure 1--continued]

|  |   |
|--|---|
| (13) Smoke   | (31) Physiological state                                    |
| (14) Temperature   | (32) Biological patterns                                    |
| (15) Lighting  | (33) Fatigue  |
| (16) Material conditions                                 | (34) Shortcomings   |
| (17) Slow sensory and motor reactions                    | (35) Relationship with the leadership                       |
| (18) Distracted attention and poor shifting of attention | (36) Vocation and type of work                              |
| (19) Movement  | (37) Class and rank   |
| (20) Senses  | (38) Social problems  |
| (21) Product design                                      | (39) Individual factor                                      |
| (22) Technological design                                | (40) Objective factor                                       |
| (23) Construction design                                 | (41) Family problems  |
| (24) Technical design                                    | (42) Relationship with the collective                       |
| (25) Labor organization                                  | (43) Wages  |
| (26) Regulations and system                              | (44) Rewards  |
| (27) Quotas  | (45) Reasons why waste and substandard products are created |
| (28) Signals   |   |
| (29) Commands  |   |
| (30) Organization and management                         |   |

It can be seen from Figure 1 that the factors affecting product quality are complex and mutually related. In particular, many material conditions, technical design, organization and management, social problems are all closely related to the human factor, and mutually affect each other. For example, improper lighting will affect vision, the ability of recognition and operation, further affecting the quality of products. Similarly, working in a very noisy environment or a high temperature environment will easily result in fatigue, emotional discomfort, loss of concentration, slowed reaction, low efficiency and poor quality. In addition, problems of organization and in management of enterprises, family, marriage, relationship with the leadership, wages and benefits and such social problems also directly affect the emotion and the work attitude of the workers, and further affect the quality of the products. It can thus be seen that the human factor is an important one in the various factors affecting production quality (see Table). Efficiency theory is to analyze the causes that produce waste and inferior products from the human factor point of view, and to seek a method of solution.

Analysis of the Causes of Waste Products at a Certain Plant

| <u>Causes of Waste Products</u>                                  | <u>Percentage of the total</u> |
|--|--------------------------------|
| Workers mistake  | 49.02                          |
| Inconsistency of manufactured product and defective fur material | 31.05                          |
| Mistaken guidance  | 8.33                           |
| Mistaken supervision   | 0.82                           |
| Poor tools   | 0.38                           |
| Poor management and incomplete facilities                        | 0.20                           |
| Others   | 10.20                          |



### 3. Psychological Analysis of the Production of Waste and Inferior Products

Any type of productive activity is a complex psychological activity. When a certain course of psychological activity is affected, motor activity will be affected, and thus affecting the quality of the product. For example, difficulty with the senses is a frequently seen cause that produces waste and inferior products, mainly caused by mistaken vision. For example, a mistaken recognition of shapes will cause mistakes in processing of products. Inaccurate judgment of the distance of sawing by a shop worker and shutting off the lathe late will cause jamming of the saws. Also, in grinding operations, the correct observation of the time of contact of a piece of work with the grinding wheel is also greatly related to the quality of the products. If the contact time of the piece of work with the grinding wheel is too short, the specifications of the common error margin will not be reached. Conversely, when the time of contact is too long, a wasted piece of work will be produced. In addition, fatigue is also often a factor affecting production. Fatigue can be classified into three types, physiological fatigue, objective fatigue and subjective fatigue. This is because fatigue can cause incoordination of motor skills, inaccuracy, distraction of attention and shifting of attention which in turn causes lateness, slowed reaction, reduction of vision and thus further affecting senses and operation of the subject, producing waste and inferior products and reducing production efficiency.

The above is a simple analysis of the factors that affect product quality from the point of view of efficiency theory. The scope of study of efficiency theory is actually very broad. It emphasizes the study of the relationship among man, machines and work environment to increase production efficiency and product quality and assure production safety and health of the workers. Therefore, with the help of the study and application of efficiency theory and psychology in quality control in enterprises, the overall work in quality control in enterprises can be done better.

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TITLE: "On the Association of PZL with Some Neutral Organophosphoric Acid Esters in Various Organic Solvents"

SOURCE: Beijing BEIJING DAXUE XUEBAO--ZIRAN KEXUE BAN [ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS PEKINENSIS] in Chinese No 3, 1980 pp 22-29

TEXT OF ENGLISH ABSTRACT: 1-phenyl-3-methyl-4-benzoyl-pyrazolone-5 (PZL) is an important chelating extractant. Many papers have been published on the extraction of more than 50 metal ions with PZL either alone or in the presence of some neutral organophosphoric acid esters. In order to elucidate the mechanism of such synergistic extractions, we have determined the association constants of PZL with TBP, DBBP, BDBP, TOPO in various organic solvents by IR, UV spectrophotometry and the solubility method. The results are summarized in the following table.

[Continuation of BEIJING DAXUE XUEBAO--ZIRAN KEXUE BAN No 3, 1980 pp 22-29]

Association Constants K of PZL and B

$$K = [PZL \cdot B] / [PZL] [B]$$

| B    | Solvents                      | Method     | K   |
|------|-------------------------------|------------|-----|
| BDBP | n-hexane                      | IR         | 1.8 |
|      | C <sub>6</sub> H <sub>6</sub> | IR         | 2.1 |
|      | Cyclohexane                   | IR         | 2.1 |
|      | CCl <sub>4</sub>              | IR         | 1.7 |
| DBBP | n-hexane                      | IR         | 1.0 |
| TBP  | TBP                           | IR         | 0.3 |
| TOPO | C <sub>6</sub> H <sub>6</sub> | IR         | 7.5 |
|      | Cyclohexane                   | IR         | 7.9 |
|      | n-hexane                      | IR         | 6.7 |
|      | n-hexane                      | UV         | 7.3 |
|      | CCl <sub>4</sub>              | IR         | 5.0 |
|      | CCl <sub>4</sub>              | Solubility | 5.6 |

The association constants K decrease with the decreasing electronegativity of the O atom of the  $-P=O$  bond, namely, TOPO > BDBP > DBBP > TBP.

AUTHOR: GUAN Yiwen [1351 1355 2429]  
ZHENG Yaoqing [6774 3852 7230]  
LI Yawen [2621 7161 2429]  
ZHAO Guizhi [6392 6311 1807]  
LIU Jianxin [0491 1696 2450]

ORG: All of the Department of Chemistry

TITLE: "Studies of the Organophosphorus Pollutants in Well Water Near a Dimethoate Plant. II. Gas Chromatographic Method for the Determination of O, O, S-Trimethyldithiophosphate and O, O, O-Trimethylthiophosphate"

SOURCE: Beijing BEIJING DAXUE XUEBAO--ZIRAN KEXUE BAN [ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS PEKINENSIS] in Chinese No 3, 1980 pp 75-83

TEXT OF ENGLISH ABSTRACT: Based on previous studies, a GC method for the determination of the main pollutants, i.e., O, O, S-trimethyldithiophosphate and O, O, O-trimethylthiophosphate, has been worked out with preliminary solvent extraction of well water samples with either benzene or chloroform, followed by the concentration of the extract in a Kuderna-Danish evaporator under partial vacuum. The GC determination of the two pollutants was carried out on either one of the following two columns: 3% DEGA/Shanghai Chemical Company 101 AW DMCS, 60-80 mesh, 1 m x 2.5 mm and 5% PEG 20M/Celite 743 AW DMCS, 60-80 mesh, 1 m x 3 mm. A flame photometric detector with a 525 nm P-filter was used. The recovery rate of solvent extraction

[Continuation of BEIJING DAXUE XUEBAO--ZIRAN KEXUE BAN No 3, 1980 pp 75-83]

with benzene or chloroform and the concentration recovery rate in the Kuderna-Danish evaporator were also determined at several fortification levels. If a well water sample of 3 l was taken and extracted with 30 ml benzene, and one-half of it was reduced to a volume of 0.5 ml, then the lower limit of determination reached 0.07 ppb when 1/ $\mu$ l of the concentrated extract was injected. The total recoveries of O, O, S-trimethyldithiophosphate and O, O, O-trimethylthiophosphate were 97 percent and 78 percent respectively. The method recommended was quite sensitive and easily reproducible.

9717  
CSO: 4009



AUTHOR: LI Rongsheng [2621 2837 3932]

ORG: None

TITLE: "On China's Inland Fish Resources and the Problem of Their Utilization"

SOURCE: Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 10, Oct 80  
pp 1-3

ABSTRACT: China's inland streams and natural lakes are extremely numerous. Areas of fresh water lakes measure 36,000 km<sup>2</sup> with additional 80,000 reservoirs of all sizes. All of these may be used to raise domesticated fishes. Fish culture of the 6 regions of the Yangzi and Huaihe valleys, the South China mountainous regions, the Huanghe and Haihe valleys, the Heilongjiang and Liache valleys, the Nei Monggol and Xinjiang regions, and the Qinghai and Xizang plateau regions is briefly reviewed. Problems in developing China's inland fishery discussed in the paper include the emphasis on grain production causing reduction of areas of natural lakes, damages to the inland water environment, and slow progress of fish culture. At present, only about one third of the water areas is used to raise fish. Judging from the current condition, the most promising areas for developing fish culture are in the suburbs. The establishment of commercial fish bases to supply live fresh water fishes to the cities and the industrial and mining centers is proposed.

AUTHOR: LU Yunting [4151 0061 0080]

ORG: None

TITLE: "Is Luobubo [Lop Nor] a Wandering Lake?"

SOURCE: Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 10, Oct 80  
pp 10-11

ABSTRACT: Affected by the neotectonic movement within the lake basin and the changing volume of water entering the lake, historically, the size of Luobubo often appears to be changing. This type of change is in fact a process of natural historical evolution, but it has often been mistaken to be the phenomenon of a wandering lake, moving sometimes to the east, sometimes to the west, and sometimes to its original position. The author reviews historical records, survey data, and satellite information to explain the fact that due to tectonic, paleo-hydrographic, and social factors, the area of the water surface of Luobubo undergoes a process of expansion and contraction. The conclusion of its being a wandering lake by 2 Russian scientists does not coincide with the facts.

AUTHOR: CHEN Yuanmou [7115 6678 6180]

ORG: None

TITLE: "Jingtong Railway"

SOURCE: Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 10, Oct 80  
p 11

ABSTRACT: The Jingtong Railway starts from the Beijing suburb of Changping, passing through Luanping, Weichang of Hebei Province, Chifeng of Zhaomuda League to reach Tongliao of Zhelimu League, both of Nei Monggol. The line measures a total of 806 km. It joins the Beijing-Baotou Line at its starting point and will be linked with Tongliao-Huohelin Mining District Line which is under construction. In order to complete the Jingtong Line, 106 tunnels, measuring a total of 73 km and 409 bridges, measuring a total of 42 km had to be constructed. In order to allow the railway to pass through a desert region, various measures were taken to stabilize the sand and to protect the roadway from the wind. In 5 short years, on both sides of a 100 km section, more than 7 million trees were planted to grow a forest covering more than 8600 mu. These trees have effectively held the sand dunes and kept the railway safe. A map depicting the length of the railroad is included.

AUTHOR: XU Maoqi [1776 5399 0366]

ORG: None

TITLE: "A Group of Mud Volcanoes in Qujiang of Sichuan Province"

SOURCE: Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 10, Oct 80  
p 14

ABSTRACT: The mud volcanoes described in the paper are distributed on the low banks of Qujiang, which is a branch of Jialingjiang. Their eruption activities are similar to ordinary volcanoes but much weaker and more importantly they do not spurt out lava. The materials gushing out of them are steam, gas, mud, etc.; they are also known as pseudo-volcanoes. Aside from describing mud volcanoes and their genesis, the paper also mentions the fact that oil and gas exploration of recent years has reduced the gaseous pressure of the region and the gushing is becoming increasingly weaker.

6168

QSO: 4009

AUTHOR: CHEN Zhixuan [7115 1807 6513]  
SU Hongxu [5685 7703 3563]

ORG: None

TITLE: "Prevention and Treatment of Metabolic Acidosis During and After Direct Vision Intracardiac Surgery Under Extracorporeal Circulation: (I) Analysis of the Amount of Sodium Bicarbonate Used During and After Direct Vision Intracardiac Surgery"

SOURCE: Beijing JIEFANGJUN YIXUE ZAZHI [LIBERATION ARMY MEDICAL JOURNAL] in Chinese No 5, Oct 80 pp 260-263

ABSTRACT: This paper analyses the amount of alkaline solution used and the various factors affecting the needed quantity in the 64 cases of open heart surgery performed at the unnamed hospital to which the authors were affiliated in 1975-78 for the purpose of finding a definite principle so as to provide reference data for the prevention and treatment of metabolic acidosis. Congenital heart diseases were involved in all 64 patients. In order to maintain urine pH at 7.5, a suitable amount of sodium carbonate was given when pH fell below 6.5. The body temperature was reduced to 28-32°C for Group A of 28 cases and 20-28°C for Group B of 36 cases. Data of the 2 groups are analyzed and compared. There was no death in the 64 cases.

AUTHOR: LIU Shiheng [0491 0013 1854]  
SHENG Zhiyong [4141 1807 0516]

ORG: None

TITLE: "Contraindications of Early Excision in Extensive Burn Crust"

SOURCE: Beijing JIEFANGJUN YIXUE ZAZHI [LIBERATION ARMY MEDICAL JOURNAL] in Chinese No 5, Oct 80 pp 264-266

ABSTRACT: Bacteria may exist in the hair follicles even under III degree burn crust and will rapidly multiply 5 days after the burn to cause serious infection; therefore, early excision of the crust is an effective measure for removing the major source of infection to create a favorable condition for early healing. In the past decade the authors treated 63 cases of severe burns and 77 early excision operations were performed. Of these, 5 patients died within 3 days of the surgery, serious complications occurred to 7 patients, and massive hemorrhage occurred during the surgery to one. This paper analyzes the clinical data of these 13 cases and discusses the conditions under which early excision of burn crust appears to be not advisable.

AUTHOR: CHEN Mingjiu [7115 7686 0046]  
ZHOU Xunyin [0719 6064 6892]  
LI Yongyao [2621 3057 1031]

ORG: None

TITLE: "Reserved Replantation of Free Mandibular Bone Fragment From Firearms Injury"

SOURCE: Beijing JIEFANGJUN YIXUE ZAZHI [LIBERATION ARMY MEDICAL JOURNAL] in Chinese No 5, Oct 80 pp 267-268

ABSTRACT: In treatment of firearm injury of mandible, it is generally agreed here and abroad that fragments joined with the periosteum should be retained or future replantation. With respect to free fragments, most Chinese surgeons believed in the past that they should be discarded. Most recently, Morgan, H.H. (ORAL SURGERY 26:727, 1968) successfully retransplanted free fragments after proper treatment. In 1975-79, the authors adopted Morgan's technique and replanted the free fragments in 3 cases of firearm injuries causing gaps of 3.5-5.0 cm of the mandibular bone. Case histories of the 3 patients are reported and discussed.

AUTHOR: ZHANG Zhongxing [1728 0022 5281]  
LI Fengzhi [2621 7364 5347]  
ZHANG Huimin [1728 1920 3046]  
TIAN Jiarong [3944 0857 2837]

ORG: None

TITLE: "Experimental Therapy of Severe Frostbite by Repeated Immersions in Warm Chlorhexidine Solution"

ABSTRACT: At present the consensus is that fast thawing with warm water is the best method of emergency rescue for severe frostbite but it is effective only when it is applied under the frozen state and is not effective after the frostbitten limbs have already thawed out. For the purpose of searching for a method of treating thawed out frostbites, the authors induced frostbites in rabbits and divided them into various groups for treatment with warm water (40°C) and warm chlorhexidine (40°C) in various procedures for comparison. Repeated immersions in warm chlorhexidine were found to produce obvious healing effect, repeated immersions in either warm water alone or in cold chlorhexidine were found to produce no effect. Repeated immersions of thawed out frostbitten rabbit limbs in warm water were found to accelerate development of tissue gangrene and should definitely not be used as a treatment.

6248  
CSO: 4009

AUTHOR: WU Enlin [0702 1869 2651]

ORG: Zhejiang University

TITLE: "Heat Treatment in Nitrogen Controlled Atmosphere"

SOURCE: Beijing JINSHU RECHULI [HEAT TREATMENT OF METALS] in Chinese No 1, 25 Jan 80 pp 8-14

ABSTRACT: Using nitrogen as a form of neutral atmosphere in heat treatment has had a history of many years but using nitrogen as one of the major components of the controlled atmosphere is a new technique developed in foreign countries only in recent years. Pure nitrogen (above 99.99 percent nitrogen content) or industrial nitrogen (having 2-5 percent of oxygen content) is used as the basic gaseous raw material. Based upon various methods of preparation and usage, a suitable amount of hydrocarbon is added along with certain reaction participating gases such as  $H_2$ ,  $NH_3$ ,  $CO_2$  etc. to form the controlled atmosphere with nitrogen as the major element for various heat treatment of metals such as polishing, chemical heat treatment, the sintering process in powder metallurgy, drilling, soldering, etc. This paper reports 2 ways of preparing the nitrogen atmosphere, its applications, and its economical benefits.

AUTHOR: IAN Tianpei [5663 1131 1014]

ORG: Chongqing Sewing Machine Plant

TITLE: "Application of Nontoxic Liquid Carburization"

SOURCE: Beijing JINSHU RECHULI [HEAT TREATMENT OF METALS] in Chinese No 1, 25 Jan 80 pp 41-42

ABSTRACT: The threading hole of the sewing machine made in Chongqing Sewing Machine Plant requires 0.40-0.50 mm of carburization and after quenching, the hardness should reach HRC50-63. Originally, sodium cyanide was used for liquid carburizing. In order to avoid using this toxic pollutant, Silicon carbide was first used to replace sodium cyanide, with some  $Na_2CO_3$  and NaCl added. Later, due to the high cost of silicon carbide, emery was used in its place. This paper describes the various experiments and the final success of preparing a mixture for nontoxic liquid carburization and discusses the key problems to be overcome in order to produce normal reactions.



AUTHOR: ZHANG Xuefa [1728 1331 4099]

ORG: Dalian Oil Pump Plant

TITLE: "Electric Furnace Silicon Controlled Trigger-free Switch"

SOURCE: Beijing JINSHU RECHULI [HEAT TREATMENT OF METALS] in Chinese No 1,  
25 Jan 80 pp 42-44

ABSTRACT: In the past, the heat treatment machine shop of the plant used AC trigger to control the temperature of its electric furnaces, and problems of burned out triggers, damaged coils, and adhesion occurred constantly. In 1975, silicon controlled AC trigger-free switch was adopted to replace the old ones. In 4 years of use, the silicon controlled switches have been proved to be reliable, safe, and fast, and to consume less electricity. The work theory of silicon controlled switches, the protective system for this equipment, and the method of making the electronic relay are described.

AUTHOR: YAN Xiaosheng [7051 0876 3932]

ORG: Shenyang Tractor Manufacturing Plant

TITLE: "Discussion of Several Problems Concerning the Heat Absorption Type Generators"

SOURCE: Beijing JINSHU RECHULI [HEAT TREATMENT OF METALS] in Chinese No 1,  
25 Jan 80 pp 44-51

ABSTRACT: The heat absorption type generator is an equipment for generating controlled atmosphere. The stability of its gas producing process is a very important problem. In view of China's current resources condition, using raw material gas of high alkene content is another important problem. This paper analyzes the release-absorption process of this type of generator. A preliminary investigation of the causes of appearance of carbon black in the operating process of the generator brings about the conclusion that carbon black appears at the base of the generator mainly during the reaction process of cracking, burning, and heat releasing of the raw material gas between 500-800°C. Based upon this understanding, some reforms are introduced to reduce the energy consumption and to provide more favorable conditions of temperature and time for the heat absorbing reaction.

6168

CSO: 4009



AUTHOR: CHENG Lanbo [2052 5695 0130]

ORG: Research Institute of Anshan Iron and Steel Company

TITLE: "On the Rational Distribution of Gas Flow for the Blast Furnace"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 7, Oct 80 pp 1-7

TEXT OF ENGLISH ABSTRACT: Based on long-term practice and a series of experiments of the blast furnaces in Anshan Iron and Steel Company, the author of this paper puts forward a viewpoint that the rational distribution of gas flow in the blast furnace is the decisive factor affecting the heat transfer, mass transfer and momentum transfer, as well as the intensification of the smelting process. This effect would naturally intensify the furnace operation and better economize iron production. The proper distribution of gas flow should be uniform and evenly distributed. Therefore the double peak curve showing the CO<sub>2</sub> percentage of throat gas should be as flat as possible in order to get the best utilization of the gas energy. The rational distribution of the gas flow in the blast furnace could be achieved mainly by the adjustment of the air blast in the lower part, accompanied by correct burden distribution in the upper part. At the same time, the hearth should be kept in good working condition. According to the facts described above, the general rules of the adjustment in the upper and lower parts of the furnace are summarized.

AUTHOR: GAO Runzhi [7559 3387 5347]

ORG: Capital Iron and Steel Company

TITLE: "The Blast Furnace Operating Experiences of Capital Iron and Steel Company"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 7, Oct 80 pp 8-13

TEXT OF ENGLISH ABSTRACT: This paper summarizes the principles and experiences of blast furnace operation of Capital Iron and Steel Company. For years a higher and steady production of good quality pig iron with low fuel consumption has been maintained. Their chief experiences include: paying close attention to the control of raw materials; keeping a fixed full blast volume; adopting a high top pressure and an oxygen enriched high temperature blast together with coal injection; using greater ore batch weight with "O↓C↓" type charging sequence. They are mainly making basic iron of low Si and low S content, operating with a fixed blast volume, high blast temperature and fixed weight of ore batch in the furnace burden.

AUTHOR: GUO Shangfen [6753 1424 1164]  
HE Yuxin [6320 3022 6580]

ORG: GUO of Tianjin Metallurgical Material Research Institute; HE of Beijing Institute of Iron and Steel Technology

TITLE: "An Analysis of Mathematic Model and Related Formulas for the Rolling Force"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 7, Oct 80 pp 14-21

TEXT OF ENGLISH ABSTRACT: The general problems regarding the rolling force formulas for cold strip rolling are analyzed.

In the derivation of Chen Jiamin's [7115 1367 3046] rolling force formula, the shear stress from friction is retained in its plasticity equation. This makes the results of calculation approach the real value. Based on this formula we have established a model for the rolling force.

The factors in eight rolling force formulas have been unified into  $\mu l/\bar{h}$  and  $\epsilon$ , so that they all have a similar functional expression  $n = \varphi(\mu l/\bar{h}, \epsilon)$ , with the following advantages:

1) The number of factors in the rolling force formula is decreased and the program of calculation and in-line control shortened.

[Continuation of GANGTIE No 7, Oct 80 pp 14-21]

2) The formulas can be quantitatively compared, and it is convenient to evaluate and choose among them.

3) Four of the formulas were converted into linear equations and the other four remain non-linear. For the non-linear formulas, simpler expressions may be used to substitute for the complicated ones.

AUTHOR: LI Lianshi [2621 6647 6108]

ORG: Beijing Institute of Iron and Steel Technology

TITLE: "Theoretical Analysis of a New 2-Skew-Roll Tube Elongator"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 7, Oct 80 pp 22-28

TEXT OF ENGLISH ABSTRACT: This paper presents a skew-roll tube elongator with side guides, semi-retained mandrel and two rolls having a "double reduction" pass design. Based on results of experiments and production practice, this elongator has proved to be superior to Assel, Transval and Diesher mill throughout, in quality of products and material consumption.

The paper also discusses the technological basis of the machine, including flow and deformation of the metal, the problem of slip, rolling force and torque, and conditions affecting roll-bite.

AUTHOR: ZHANG Shanyuan [1728 0810 0337]

JIN Yukang [7246 5940 1660]

Hideaki MATSUBARA

Hisashi SUZUKI

ORG: ZHANG and JIN both of the Central Iron and Steel Research Institute, Beijing; MATSUBARA and SUZUKI both of the University of Tokyo

TITLE: "Bending Load-Deflection Curves in WC-Co Cemented Carbide"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 7, Oct 80 pp 29-36

TEXT OF ENGLISH ABSTRACT: The deformation characteristics of WC-(10~30)%Co cemented carbide were studied in the temperature range from room temperature to 1000°C by means of the three-point bend test as a function of cobalt contents, carbide grain size and domain size of binder.

It was found that, in the alloy with a fixed cobalt content, the deformation became suppressed above about 800°C with increasing carbide grain size, and above about 600°C with increasing domain size of binder, effects of the two factors being converse to those observed at lower temperatures. It was also found that at a fixed temperature the transverse-rupture strength of the alloy generally increased with the steepness of load-deflection curves.

AUTHOR: LIU Jinkong [0719 6855 2873]  
MA Huijun [7456 1920 0689]  
REN Dongwei [0117 2639 0251]  
HU Keren [5170 0668 0086]  
CI Yunxiang [1964 0061 4382]

ORG: LIU, MA, REN and HU all of Beijing Rare Earth Research Institute; CI of the Department of Chemistry, Beijing University

TITLE: "Spectrophotometric Determination of Total Rare Earth Content and Yttrium Subgroup in Microamounts"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 7, Oct 80 pp 37-40

TEXT OF ENGLISH ABSTRACT: A spectrophotometric method for the determination of total rare earths (RE) and yttrium subgroup in microamounts is proposed, using chromazurols, 1,10-phenanthroline and cetyltrimethylammonium bromide. The total RE is determined in a solution with pH 9.5. The limit of detection is 0.008  $\mu\text{g/ml}$ . Interference from various ions is reported. The interference of  $\text{Fe}^{3+}$  and  $\text{Al}^{3+}$  is eliminated with hydroxylamine and sulfosalicylate respectively. The yttrium subgroup was determined in a solution with pH 8.4. The interference of cerium group elements is eliminated by an addition of sodium bicarbonate. The method is accurate enough for practical purposes.

AUTHOR: YANG Dong [2799 2767]  
LU Shanghan [5684 1424 3352]  
ZHI Shui [4249 3055]

ORG: YANG and LU both of the Iron and Steel Department, Ministry of Metallurgical Industry; ZHI of the Central Iron and Steel Research Institute, Ministry of Metallurgical Industry

TITLE: "Development of Powder Injection Technique in Our Country"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 7, Oct 80 pp 51-55

TEXT OF ENGLISH ABSTRACT: A technical demonstration of powder injection apparatus and operation was held in Beijing in April 1980. Three main types of injection systems, namely, the partly fluidized unit with bottom discharge, the partly fluidized unit with top discharge, and the unit with partly loosened material and bottom discharge, as well as the results of using these units, are described. The selection of injection vessel and technology, problems in injection metallurgy engineering, powders of new types, refractory and mechanism of injection metallurgy are discussed in connection with actual practice in China.

AUTHOR: ZHI Shui [4249 3055]  
ZHANG Bingying [1728 4426 5391]  
LOU Shenghe [2869 4141 6378]

ORG: All of the Central Iron and Steel Research Institute, Ministry of Metallurgical Industry

TITLE: "Injection Metallurgy Abroad--Technique of Powder Injection in Ladle"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 7, Oct 80 pp 56-65

TEXT OF ENGLISH ABSTRACT: Powder injection in ladle is a new technology developed during the 70's. Up to now more than 40 units have been used in industry around the world. The main types of equipment are TN (Thyssen Niederrhein) system and SL (Scandinavian Lancers) system. The powders used are: Ca-Si,  $\text{CaC}_2$ , Mg + CaO,  $\text{Ca(CN)}_2$ , CaO, etc. For the TN process ladles are lined with dolomite, and for the SL process both fire clay and magnesia brick are suitable. Usually argon is used as the carrier gas.

As a result of powder injection, some detrimental elements in steel can be substantially lowered, such as, S to 0.002~0.005%, P to 0.005%, O to 0.0015%. MnS inclusions can be eliminated and undeformable inclusions of the spinel ( $\text{CaO} \cdot \text{Al}_2\text{O}_3$ ) type formed. Ultra low sulfur steel, low phosphoric steels and heavy plates with superior toughness in Z direction can thus be produced. The powder injection

[Continuation of GANGTIE No 7, Oct 80 pp 56-65]

technique has the advantages of simple equipment, low investment, low operation cost, good flexibility, etc. It is estimated that injection metallurgy will find more and more use in the steelmaking industry during the 80's.

9717  
CSD: 4009

AUTHOR: YU Hang [0151 5300]

ORG: None

TITLE: "Ten Years After the Launching of China's First Satellite"

SOURCE: Beijing XIANDAIHUA [MODERNIZATION] in Chinese Vol 2 No 10, 16 Oct 80  
pp 3-5

ABSTRACT: On 24 Apr 70, China launched successfully for the first time an artificial satellite, Dongfanghong-1 to establish a foundation for her space technology. In the 10 years since, a total of 8 satellites have been launched and the successful return of satellites to the earth's ground surface especially signaled the progress of her space technology in the past decade. A control network for ground surface surveying, a computer center, a launching platform, a base of considerable size for satellite research, production, and large scale environmental experiment, and a team of young space technology scientists are all achievements in the past 10 years. This paper reviews briefly these accomplishments, the 2 types of carrier rockets used to launch these satellites, and the instruments that dispatch telecommunication signals to control the rocket operations. There is also a section in the paper discussing future development in China in satellite communication, resources surveying, earthquake, environmental pollution, forest fire, crop condition observation. Possibility of using satellites for archaeological research, weather forecasting, etc. is also briefly mentioned.

AUTHOR: WU Zengyi [5012 2582 0034]  
DENG Wenhai [6772 2429 3189]

ORG: Both of Institute of Sonics, Chinese Academy of Sciences

TITLE: "A Oil-saving Whistle--X Type Cantilever Reed Whistle"

SOURCE: Beijing XIANDAIHUA [MODERNIZATION] in Chinese Vol 2 No 10, 16 Oct 80  
pp 13-14

ABSTRACT: This paper describes the X type cantilever reed whistle made of steel, measuring 3 cun in length and weighing no more than 2 jin. If the whistle is installed in such a position so that fuel oil and water flow through the whistle in a high speed, the oil and the water will receive a supersonic treatment to become extremely finely grained and very homogenized emulsion, and a very good fuel. If crude oil is thus mixed with water to make a fuel for burning, a saving of 5-10 percent may be obtained. This paper explains the secret of producing supersonic by this type of whistle and the method of determining the various parameters of the supersonic treatment process.



**AUTHOR:** YANG Huayu [2799 5478 3254]

**ORG:** Beijing Anding Hospital

**TITLE:** "Combining Psychology and Medicine to Give Birth to Psychosomatic Medicine"

**SOURCE:** Beijing XIANDAIHUA [MODERNIZATION] in Chinese Vol 2 No 10, 16 Oct 80  
pp 15-16

**ABSTRACT:** The author claims that the influence of psychological factors on the health and diseases of the human body had been recognized in Chinese traditional medical classics. In modern times, more attention is given to this influence. Since the 1930's, some diseases have been understood to be caused by psychological factors to a large degree and they are called psychosomatic diseases and their study is called psychosomatic medicine. This paper explains the relationship between anger and hypertension, coronary disease and the patient's personality, emotions and the activation of malignant cells, mood and stomach ulcer, emotional reactions of the skin, etc. Other diseases, such as migraine, arrhythmia, hyperthyroidism, ulcerative colitis, obesity, psoriasis, etc. are also known to be related to psychological factors.

616 8

CSO: 4009

AUTHOR: WANG Jianju [3769 1696 5282]

ORG: Department of Mathematics

TITLE: "Extension of Real Number System and Generalization of Limit Operation"

SOURCE: Xiamen XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN [UNIVERSITATIS AMOIENSIS ACTA SCIENTIARUM NATURALIUM] in Chinese No 3, 1980 pp 1-9

TEXT OF ENGLISH ABSTRACT: In this paper, the real number system  $R$  is extended by means of real number sequences. Let  $m$  denote the set of bounded real number sequences,  $(x_1, x_2, \dots, x_n, \dots)$ , and  $s$  denote the set of real number sequences  $(x_1, x_2, \dots, x_n, \dots)$ . Suppose  $\theta = \{(x_1, x_2, \dots, x_n, \dots) : \lim_{n \rightarrow \infty} x_n = 0, x_n \in R, n = 1, 2, \dots\}$ . It is shown that the factor space  $K = m/\theta$  and  $G = s/\theta$  are proper extensions of  $R$ .

The homomorphic mapping  $L$  from  $s$  onto  $G$  has the following property

$$L(x) = \lim_{n \rightarrow \infty} x_n,$$

where  $x = (x_1, x_2, \dots, x_n, \dots)$ ,  $\lim_{n \rightarrow \infty} x_n = x_0$ ,  $x_0 \in R$ . The mapping  $L$  is called a limit operator.

The algebraic and topological structure of  $K$  and  $G$  is discussed.

AUTHOR: ZHUANG Qionghuan [5445 8825 3790]

ORG: Department of Mathematics

TITLE: "The Second Boundary Value Problem for Degenerate Parabolic Equations"

SOURCE: Xiamen XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN [UNIVERSITATIS AMOIENSIS ACTA SCIENTIARUM NATURALIUM] in Chinese No 3, 1980 pp 10-25

TEXT OF ENGLISH ABSTRACT: In this paper the second boundary value problem for degenerate parabolic equations in a bounded domain  $Q = \Omega \times (0, T]$  is considered.

$$Lu = a^{ij}(x, t)u_{x_i x_j} + b^i(x, t)u_{x_i} + c(x, t)u - a(x, t)u_t = f(x, t) \text{ in } Q$$

$$(I) \quad \frac{\partial u}{\partial \nu} - \psi(x, t)u = 0 \text{ on } S = \partial\Omega \times (0, T]$$

$$u(x, 0) = 0$$

$$\text{where } \frac{\partial}{\partial \nu} = \gamma_1(x) \frac{\partial}{\partial x_1} + \dots + \gamma_n(x) \frac{\partial}{\partial x_n}, \quad \sum_{i=1}^n \gamma_i^2(x) = 1$$

Under the following assumptions:  $c(x, t) \leq 0$ ,  $\psi(x, t) \geq 0$  and for any  $\xi = (\xi_1, \dots, \xi_n)$ ,

$$\mu(x, t)|\xi|^2 \leq a^{ij}\xi_i \xi_j \leq \nu_1(x, t)|\xi|^2, \quad \mu(x, t), \nu_1(x, t) \geq 0$$

and  $a(x, t) + \mu(x, t) \geq \mu > 0$  for all  $(x, t)$  in  $\bar{Q}$ , by the method of regularization

[Continuation of XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN No 3, 1980 pp 10-25]

and priori estimate for the solutions of the second boundary value problem for parabolic equations, the existence and uniqueness theorem of the solution for problem (I) has been proved.

AUTHOR: HUANG Zhongqi [7806 6850 0892]

ORG: Longyan Teacher's University

TITLE: "The Decomposition of a Sphere with Respect to a Measure"

SOURCE: Xiamen XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN [UNIVERSITATIS AMOYENSIS ACTA SCIENTIARUM NATURALIUM] in Chinese No 3, 1980 pp 26-30

TEXT OF ENGLISH ABSTRACT: Let  $S^n (n \geq 2)$  be an  $n$ -dimensional sphere, and  $\mu$  be a positive Radon measure on  $S^n$  such that  $\mu(S^n) = 1$ . A subset of  $S^n$  will be said to be too big if it is of a measure greater than  $1/2$ . A subset of  $S^n$  will be said to crumble if no component of its complement is too big.

In the present paper the following theorem is proved:

Theorem: Suppose that  $A$  is a measurable set on  $S^n$  and every component of  $A$  is open relative to  $A$ , then either  $A$  or  $S^n - A$  has a component which crumbles  $S^n$ .

An example is given to show that in the above theorem the assumption of the relative openness percentage of every component of  $A$  cannot be omitted.

AUTHOR: YE Rengui [5509 1103 4097]

ORG: Department of Physics

TITLE: "On the Spectral Line Splitting From a Rotating Light Source"

SOURCE: Xiamen XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN [UNIVERSITATIS AMOIENSIS ACTA SCIENTIARUM NATURALIUM] in Chinese No 3, 1980 pp 31-33

TEXT OF ENGLISH ABSTRACT: It is easy to prove that each of the spectral lines from a rotating light source would split into two or three components similar to those of the classical Zeeman effect. Such a spectral splitting effect might be used to detect the spinning of stars, especially those rotating rapidly and emitting radio waves, e.g., pulsar PSR0531+21 in the Crab nebula.

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TITLE: "LiNbO<sub>3</sub> Optical Modulators at High Information Rates"

SOURCE: Xiamen XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN [UNIVERSITATIS AMOIENSIS ACTA SCIENTIARUM NATURALIUM] in Chinese No 3, 1980 pp 34-44

TEXT OF ENGLISH ABSTRACT: A lithium niobate (LiNbO<sub>3</sub>) optical modulator at high information rates has been designed by considering its configuration and stability, synchronous bandwidth, modulation efficiency, extinction ratio, insertion loss and modulated crystal size. The cutting and polishing of electrooptic crystals are described, and the adjustment technology of the modulator and its performance test are discussed. The combination modulator is developed, of which the characteristics, in general, have that the half-wave retardation voltage is 35V operated at a wavelength of 0.63μ, the extinction ratio is better than 17dB, the transmission factor is more than 38 percent, the capacitance is 30pf and the theoretical (calculated)

[Continuation of XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN No 3, 1980 pp 34-44]

synchronous bandwidth is approximately 700 MHz. In addition, the piezoelectric resonance is damped. The modulator was found satisfactory in the combined experiment on PCM visible telephone communication by means of an optical fiber link.

AUTHOR: ZOU Dongliang [6760 2767 2733]

ORG: Department of Oceanography

TITLE: "The Nature of Points of Inflection on the V-I Curve in Electrodialysis"

SOURCE: Xiamen XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN [UNIVERSITATIS AMOIENSIS ACTA SCIENTIARUM NATURALIUM] in Chinese No 3, 1980 pp 45-53

TEXT OF ENGLISH ABSTRACT: In this paper the polarization behavior of an ion exchange membrane in electrodialysis was investigated on flow conditions. The nature of two points of inflection on the V-I curve has been cleared. The relationship between the number of the points of inflection and the number of electrolytes in the system has also been established.

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CAI Weiping [5591 4850 1627]

ORG: All of the Department of Chemistry

TITLE: "Chronoamperometry Determination of Dissolved Oxygen in Seawater Using Oxygen Electrode without a Membrane"

SOURCE: Xiamen XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN [UNIVERSITATIS AMOENSIS ACTA SCIENTIARUM NATURALIUM] in Chinese No 3, 1980 pp 54-63

TEXT OF ENGLISH ABSTRACT: A new method of determination of dissolved oxygen in seawater using an oxygen electrode without a membrane has been made. Differing from the Clark cell, a new model for the dissolved oxygen probe has been designed with the following features:

- (1) Without a gaseous diffusion semi-permeable membrane;
- (2) Provided with two gold cathode electrodes (a disc and a ring) and a ring anion-exchange membrane;
- (3) Automatic inlet of sample water into the probe not interfered with by air.

By means of this modification, the stability of the probe is increased and hysteresis decreased. The determination procedures and calibration are described. The

[Continuation of XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN No 3, 1980 pp 54-63]

method is fast (a sample/2 min) and accurate ( $\pm 1 \sim 1.5$  percent) and can be satisfactorily used in the laboratory on ship.



AUTHOR: YAN Sixu [7346 1835 2485]  
CHEN Suli [7115 4790 7787]  
CAI Hongyu [5591 4767 3768]  
et al.

ORG: All of the Department of Biology

TITLE: "Enzymological Studies on Amphioxus Bronchiostoma leichleri (Gray).  
II. Kinetics of Purified Alkaline Phosphatase"

SOURCE: Xiamen XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN [UNIVERSITATIS AMOIENSIS ACTA SCIENTIARUM NATURALIUM] in Chinese No 3, 1980 pp 64-71

TEXT OF ENGLISH ABSTRACT: An alkaline phosphatase was partly purified from amphioxus by extraction, ammonium sulfate fractionation, pH regulation and gel filtration with Sephadex G-100. Preliminary kinetic studies of the enzyme were undertaken. The results are as follows:

The optimum pH of alkaline phosphatase for the hydrolysis of disodium phenyl phosphate is 10.1, and the optimum temperature is 40°C. The Michaelis-Menten constant  $K_m$  is  $1.13 \times 10^{-3}M$  at pH 10.1. Under given experimental conditions, the Michaelis-Menten constant  $K_m$  varies with different pH values, whereas the maximal velocity  $V_{max}$  remains unchanged, which indicates that the effect caused by the pH is of the competitive type.

[Continuation of XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN No 3, 1980 pp 64-71]

The alkaline phosphate is strongly activated by  $Mg^{++}$  ion, but is inhibited by  $Zn^{++}$ , EDTA, DFP, 2-mercaptoethanol and PCMB. The  $K_i$ 's of three inhibitors were determined and were found to be of the noncompetitive type. The marked inhibition of 2-mercaptoethanol on the enzyme suggests that the disulfide bond is essential to the maintenance of the enzyme activity. From the  $v$  versus pH plot, the pK value of the dissociation of the active group is 9.82 which suggests that  $-NH_2$  group might be an active group of the enzyme.

The energy of activation is 3.16 kcal/mole, and the temperature coefficient  $Q_{10}$  (at 30-40°C) is 1.15.

AUTHOR: HUANG Kefu [7806 0344 2591]  
LIU Yueying [0401 2588 5391]  
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LIN Weixing [2651 4850 5281]

ORG: HUANG, LIU and SHEN all of the Department of Biology, Xiamen University;  
LIN of Qiaoxing Chemical Plant, Xiamen

TITLE: "Studies on Metabolic Pathways in Relation to the Synthesis of Glutamate  
in Corynebacterium crenatum B-9"

SOURCE: Xiamen XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN [UNIVERSITATIS AMOIENSIS ACTA  
SCIENTIARUM NATURALIUM] in Chinese No 3, 1980 pp 72-80

EXCERPT FROM ENGLISH ABSTRACT: Some tests were carried out to investigate the  
activities of enzymes in relation to the synthesis of glutamate in cell-free ex-  
tracts from secondary seeds and fermenting cultures of Corynebacterium crenatum  
B-9.

NADPH linked glutamate dehydrogenase, aspartate aminotransferase and alanine amino-  
transferase exhibited marked activities in all extracts. Aspartase can be detected  
in the early stage of fermenting culture. NADPH linked glutamate synthase reveals  
an activity approaching 1/10 that of glutamate dehydrogenase. The main route of

[Continuation of XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN No 3, 1980 pp 72-80]

glutamate synthesis in B-9 appears to be via  $\alpha$ -ketoglutarate amination catalyzed  
by glutamate dehydrogenase. It seems that glutamate synthase and aspartase may  
take some part in the process.

AUTHOR: HUANG Houzhe [7806 0624 0772]  
LUO Huiming [5012 2545 2494]

ORG: HUANG of the Department of Biology; LUO of the Department of Oceanography

TITLE: "Preliminary Investigation on the Diet Ingestion and Absorption of Schmackeria dubia and Artemia salina"

SOURCE: Xiamen XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN [UNIVERSITATIS AMOYENSIS ACTA SCIENTIARUM NATURALIUM] in Chinese No 3, 1980 pp 81-90

TEXT OF ENGLISH ABSTRACT: The diet ingestion and absorption of Schmackeria dubia and Artemia salina were investigated with the  $^{14}\text{C}(\text{NaH}^{14}\text{CO}_3)$  or  $^{35}\text{S}(^{35}\text{S-Methionine})$  labelling techniques and the following results were obtained.

Using labeled Platymonas sp. and Nitzschia closterium as diet-phytoplanktons, the filtering rate of S. dubia as well as of A. salina decreases differently with the raising of the diet density within a certain limit, and remains at a lower rate with the raising of the diet density still further. The turning point was found to be near  $10^5$  individuals/ml in the case of Platymonas feeding. The absorbance increases with the raising of the diet density up to a certain level.

The filtering rate, feeding rate and absorbance increase markedly with the development of the animals.

[Continuation of XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN No 3, 1980 pp 81-90]

The absorption efficiency decreases with the increase of the diet density, and remains at a lower level in further raising of the diet density. It seems that superfluous feeding may be encountered in a higher level of diet density.

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ZHENG Welyun [6774 1792 0061]  
et al.

ORG: All of the Department of Oceanography

TITLE: "Studies on the Phototactic Behavior of Cuttlefish (Sepiella maindroni de Rochebrune)"

SOURCE: Xiamen XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN [UNIVERSITATIS AMOENSIS ACTA SCIENTIARUM NATURALIUM] in Chinese No 3, 1980 pp 91-99

TEXT OF ENGLISH ABSTRACT: The photoreceptor of cuttlefish is of the rhabdom type.

The electroretinogram (ERG) of the intact eyes of cuttlefish is a simple cornea negative wave, followed by a positive deflection as the light is turned off. During the course of dark adaptation with different light levels, there are great differences in times to recover the dark adaptation threshold. During the course of light adaptation, the incremental curves by different wavelengths do not show an intersecting tendency. The scotopic spectral sensitivity ( $S_A$ ) curve of cuttlefish has its maximum at 490 nm and has no secondary peak. The purkinje shift does not occur when adapting to white or colored light of different intensities.

[Continuation of XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN No 3, 1980 pp 91-99]

The optimum illumination of cuttlefish is within the amplitude between 0.01-10 lux. It is suggested that the phototaxis belongs to the dim light type. The influence of background light on the phototactic ratio of cuttlefish weakens with increasing light intensity.

AUTHOR: ZHANG Jinbiao [1728 6855 2871]  
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ORG: ZHANG of the Third Institute of Oceanography, National Bureau of Oceanography; XU of Xiamen University

TITLE: "On the Geographical Distribution of the Siphonophores in the China Sea"

SOURCE: Xiamen XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN [UNIVERSITATIS AMOIENSIS ACTA SCIENTIARUM NATURALIUM] in Chinese No 3, 1980 pp 100-108

EXCERPT FROM ENGLISH ABSTRACT: In the present paper we made a comprehensive study on the species composition and geographical distribution of the Siphonophores in the China Sea. As a whole, 72 species of Siphonophores were hitherto recorded. Among them, one species occurred in the Bohai Sea, 4 in the Yellow Sea, 48 in the East China Sea and 67 in the South China Sea. The ecological characteristics of the Siphonophore fauna in the China Sea were analyzed in detail. Based on this, the Siphonophores in the China seas can preliminarily be separated into the four ecological groups.

AUTHOR: CHENG Zhaodi [4453 0340 4574]  
LIN Dexiang [6855 1795 4382]

ORG: Both of the Department of Biology

TITLE: "Notes on Some New Species and New Records of Diatoms from the Strait of Taiwan (Fujian Coast), China"

SOURCE: Xiamen XIAMEN DAXUE XUEBAO--ZIRAN KEXUE BAN [UNIVERSITATIS AMOIENSIS ACTA SCIENTIARUM NATURALIUM] in Chinese No 3, 1980 pp 109-116

TEXT OF ENGLISH ABSTRACT: In the study of diatoms collected from the Strait of Taiwan, the southeast coast of China, three new species, two new varieties of Coscinodiscus and Caloneis, and 60 new records of diatoms of these genera and others were recorded. The new diatoms are:

Coscinodiscus hexagonus Cheng et Chin, sp. nov.

C. paradoxus Cheng et Chin, sp. nov.

C. bathyomphalus var. hispidus Cheng et Chin, var. nov.

Caloneis platycephala Cheng et Chin, sp. nov.

C. elongata var. constricta Cheng et Chin, var. nov.

9717  
CSO: 4009

AUTHOR: LIU Baoyin [0491 1405 689E]

ORG: None

TITLE: "Ocean and Liver Cancer"

SOURCE: Beijing HAIYANG [OCEANS] in Chinese No 10, Oct 80 pp 5-6

ABSTRACT: Early in the 1960's, ten thousand turkeys in England died suddenly. Dissection disclosed the cause of death to be necrosis of the liver. Considerable investigation by many scientists revealed the fact that the death was the direct result of eating moldy peanut powder imported from Brazil and analysis of the peanut powder disclosed its *Aspergillus flavus* content. While medical scientists had pointed out that flavotoxin B<sub>1</sub> of that mold is most damaging to the liver, this incident provided a shocking evidence of its carcinogenesis. Experimental feeding of moldy peanuts to domestic fowls reinforced the finding. Due to the fact that peanuts of the coastal region become moldy more easily because of the high humidity of the ocean, according to statistical studies of related departments, liver cancer mortality rate of the coastal plains is 3-5 times that of the inland regions. The author explains the relationship of eating moldy food and liver cancer and warns inhabitants of regions of high humidity and high temperature to be especially careful not to eat moldy foods.

AUTHOR: MA Shusen [7456 2885 2773]

ORG: None

TITLE: "Shadowless and Formless Pollution of the Oceans"

SOURCE: Beijing HAIYANG [OCEANS] in Chinese No 10, Oct 80 pp 23-24

ABSTRACT: The oceans have always contained radioactive substances releasing alpha, beta, or gamma rays. Since the first atomic bomb was made by the USA in 1945, various man-made radioactive substances have entered the oceans in massive quantities. The effects of this added radiation and the distribution of man-made radioactive substances in the oceans have become the subject of extensive studies by scientists in the past 2 decades. It is the consensus that the current level of radiation pollution of the oceans has not yet reached the degree to be harmful to fish species, but the radiation level of the regions of the oceans where radioactive wastes have been disposed is already 1000 times higher than the natural level to have caused a reduction of reproductive capacity of many marine species there. The gradual enlargement of these regions with the expansion of utilization of nuclear energy should be an important problem demanding the attention of everyone.

6168

CSO: 4009



AUTHOR: ZHANG Guohua [1728 0948 5478]

ORG: None

TITLE: "A General Linearized Theory for Supercavitating Hydrofoil Sections"

SOURCE: Wuxi ZHONGGUO ZAOCHUAN [SHIPBUILDING OF CHINA] in Chinese No 4, 1980  
pp 1-26

EXCERPT FROM ENGLISH ABSTRACT: In this paper, a general linearized theory for the calculations of supercavitating hydrofoil sections in direct problems (in which the shape of the wetted surface is previously prescribed) as well as in inverse problems (in which the pressure distribution on the wetted surface is prescribed) by employing the singularity method is presented.

AUTHOR: YE Yuanpei [5609 0347 1014]  
ZHOU Liandi [0719 6647 4574]  
ZHENG Yongmin [6774 3057 2404]

ORG: None

TITLE: "Experimental Investigations of the Performance of Ducted Propeller Series in Cavitating Conditions"

SOURCE: Wuxi ZHONGGUO ZAOCHUAN [SHIPBUILDING OF CHINA] in Chinese No 4, 1980  
pp 27-41

TEXT OF ENGLISH ABSTRACT: Cavitation-tunnel experiments investigating the performance of D-series ducted propellers in cavitating conditions were carried out in uniform flow. The experiments fitting four bladed propellers D-series ( $A_E/A_0 = 0.7, 1.0$ ) to one of the ducts BD15 ( $t/L = 0.15$ ) and BD12 ( $t/L = 0.12$ ) are finished. It was found that the rules of the performance of ducted propellers in cavitation are not completely the same as those of conventional propellers. For each given cavitation number  $\sigma_v$ , there exists respectively a maximum of critical thrust coefficient in the first and second stages of cavitation. The various methods for wall-effect correction were analyzed and the method based on  $C_{Th}$  identity is recommended. For calculating the characteristics by computer, the regression coefficients of the experimental results were provided. Some of the regression coefficients and the charts are given in this paper.

AUTHOR: SUN Fuzhong [1327 1788 0022]

ORG: None

TITLE: "On the New Theory and Calculating Method of the Motion of Semi-Submersibles"

SOURCE: Wuxi ZHONGGUO ZAOCHUAN [SHIPBUILDING OF CHINA] in Chinese No 4, 1980 pp 64-78

TEXT OF ENGLISH ABSTRACT: Starting with the analysis of the hydrodynamic forces acting on a three-dimensional cylinder with an axial symmetrical cross section and taking into account the non-linear viscous effect, general expressions for the hydrodynamic coefficients, exciting forces and motion equation are derived. The motion amplitude and phase angle of a semi-submersible in regular waves are solved by means of the iteration method after the non-linear viscous effect was processed linearly.

According to the motion behavior of semi-submersibles in regular waves, it is proposed to employ the concept of equivalent wave height for the calculation of transfer functions based on the linear statistical analysis theory. The long-term distribution characteristics of motion are calculated by conditional probability and by applying the method of probability transformation.

[Continuation of ZHONGGUO ZAOCHUAN No 4, 1980 pp 64-78]

A computer program has been developed. Comparison between model experimental and theoretical data has shown satisfactory agreement.

9717

CSO: 4009

AUTHOR: ZHENG Lianda [6774 5114 6671]  
WANG Yiyun [3769 2034 0061]

ORG: None

TITLE: "Using Cold Start Glow Type Fluorescent Lamp to Capture Earthquake Data"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 5, 26 Oct 80  
pp 2-4

ABSTRACT: The authors were told by someone in the eastern part of Beijing that when he was awakened by the Tangshan earthquake in 1976, he noticed his fluorescent lamp was turned on by itself and it stayed lit even after he turned the switch off once again. Another person reported the fact that his fluorescent lamp came on by itself and could not be turned off until the following morning. The same phenomenon was reported during an earthquake in the USSR. The authors theorize that during the earthquake process, the increased intensity of cosmic ray causes an increase of electron particles in the fluorescent tube so that the light comes on by itself. Based upon this theory, the authors constructed 3 simple instruments to serve as an earthquake warning system and to record the data during an earthquake.

AUTHOR: CHENG Aihua [4453 5337 5478]  
YIN Shilin [3009 0013 2651]  
LU Xuezheng [7120 1331 2973]  
GUO Yixin [6751 0001 2450]

ORG: None

TITLE: "Ground Water Movement in Liyang Before the Earthquake"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 5, 26 Oct 80  
pp 7-8

ABSTRACT: On 9 Jul 79, a 6.0 earthquake occurred between Shangpei Commune and Shangxing Commune, in Liyang County of Jiangsu Province. Just before the earthquake, there were large scale rise and fall of the ground water in the area to reflect the condition of stress-strain under the ground surface. The water table of a well 7 km from the epicenter rose steadily from 20 Jun 79 and a net gain of 2m was recorded just before the earthquake. In another well nearby, water was observed to spill out of the well about 10 minutes before the earthquake started. Other changes of the water of the wells in the area included noise, odor, turbid, spinning, etc. A map of observed ground water anomalies in relation to the epicenter of the earthquake is included in the paper.

AUTHOR: WANG Bingfu [3679 4426 1381]

ORG: None

TITLE: "Monitoring Earthquake With a Combined Carbon and Sulfur Test Instrument"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 5, 26 Oct 80  
p 17

ABSTRACT: The author and colleagues used a combined carbon and sulfur test instrument to determine the carbon and sulfur contents of iron and steel. The instrument utilizes carbon dioxide and hydrogen sulfide of the ground water and volatile acid to produce a reading. Normally, on dry runs without specimens, the reading is 0. Occasionally, a 1-3 reading may appear for one to several days, but will return to 0 afterwards. From 11 Sep to 12 Oct 79 the dry run readings fluctuated from 3 and 18 and stayed that way throughout that month. Two earthquakes occurred to the southwest of Zhangjiakou at 21'25" and 22'48" on 11 Oct 79, and 15 earthquakes occurred from 11 to 14 Oct 79. The epicenter of these earthquakes was only about 10km from the deep well (more than 80 m in depth) from which the water was used for the tests. The author concludes that high contents of carbon dioxide, hydrogen sulfide, and volatile acids of the ground water related to these earthquakes had caused the abnormal readings of the test instrument.

AUTHOR: SHANG Hongkuan [0794 1347 1401]

ORG: None

TITLE: "Brief Introduction of Seismologic Geology of the Sanxia [Three Gorges of the Yangzi] Region"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 5, 26 Oct 80  
pp 20-21, 29

ABSTRACT: At present The Gezhouba Dam under construction is located below Sanxia. When it is completed, it will generate electricity by the flow of the Yangzi to a capacity of 3000-2500 Mw and that will make it one of the largest power plant in the country. If a 200 m high dam should be built in the Sanxia region, it may have a capacity of 30,000-25,000 Mw and should change the power shortage situation of the country by itself. The important problem of such a hydroelectric power plant is the problem of regional stability. A study of the seismologic geology of the Sanxia Region is, therefore, very significant. The facts concerning this region's gradual change from weak to a strong earthquake region and its geological background are briefly discussed.

AUTHOR: FAN Guangwei [5400 1684 0251]

ORG: None

TITLE: "Flashes of Light Preceding an Earthquake and Ion Radiation"

SOURCE: Beijing DIZHEN ZHANXIAN [SEISMOLOGY FRONT] in Chinese No 5, 26 Oct 80  
p 38

ABSTRACT: There have been reports of engineers taking emergency measures when they saw flashes of light just before the Haicheng earthquake of 75 as well as the Tangshan earthquake of 76. They were able to save lots of lives due to the flashes of light warning. There are many speculations concerning the origin of these flashes. This paper reports an experiment in an unnamed foreign country with rock specimens placed in a press. As the pressure increased, a current measuring  $10^{-10}$  amp was detected. When the rock specimen was about to break and the current measured  $10^{-11}$  amp, electrons of an energy of 15 ev and positive ion radiation were observed. If the rock specimen was in an helium environment, flashes were not observed, but if the specimen was in an environment filled with water vapor or oxygen, the phenomenon of flashes of light was observed as the electrons and positive ions caused the water molecules or the oxygen molecules to be excited and to irradiate photons.

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